

Aerospace Testing Seminar



"The Challenge of Effective and Affordable Testing"

Sheraton Gateway Hotel Los Angeles

Oct. 16 – 18, 2012

Celebrating Four Decades of the Aerospace Testing Seminar

ABSTRACT SUBMITTAL FORM: Abstracts due January 16, 2012

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I. ABSTRACT TITLE (PLEASE ENTER ABSTRACT TITLE)

Verification of Ares I Liftoff Acoustic Environments via the Ares I Scale Model Acoustic Test

II. ABSTRACT (PLEASE ENTER ABSTRACT OF 200 WORDS OR LESS. ENCLOSE ATTACHMENTS AS NEEDED)

Launch environments, such as Liftoff Acoustic (LOA) and Ignition Overpressure (IOP), are important design factors for any vehicle and are dependent upon the design of both the vehicle and the ground systems. The NASA Constellation Program had several risks to the development of the Ares I vehicle linked to LOA which are used in the development of the vibro-acoustic environments. The risks included cost, schedule and technical impacts for component qualification due to high predicted vibro-acoustic environments. One solution is to mitigate the environment at the component level. However, where the environment is too severe to mitigate at the component level, reduction of the launch environments is required.

The Ares I Scale Model Acoustic Test (ASMAT) program was implemented to verify the predicted Ares I launch environments and to determine the acoustic reduction for the LOA environment with an above deck water sound suppression system. The test article included a 5% scale Ares I vehicle model, tower and Mobile Launcher. Acoustic and pressure data were measured by approximately 200 instruments. The ASMAT results are compared to the Ares I LOA predictions and water suppression effectiveness results are presented.

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